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RESOURCES AND PRACTICES IN COTTON PRODUCTION

Texas Blackland, Coastal Bend, and
Lower Rio Grande Areas

Bill Bolton, Don E. Ethridge,
Billy G. Freeman and W. C. McArthur

August 1978

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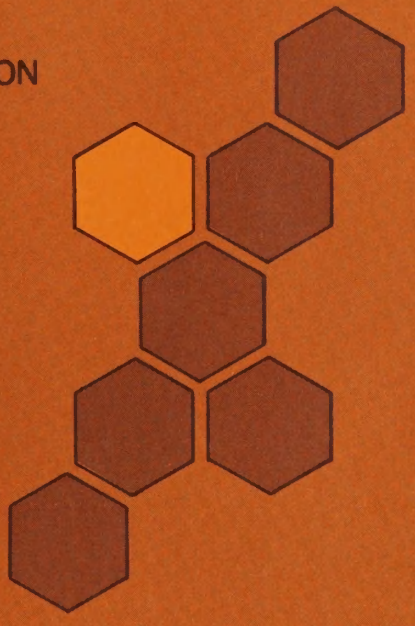

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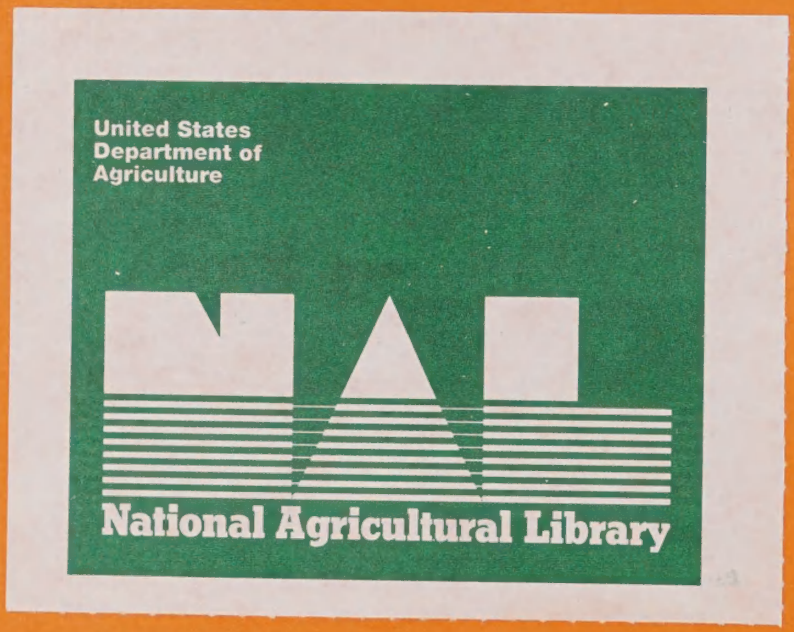
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Texas Blackland, Coastal Bend, and Lower Rio Grande Areas

Bill Bolton,[1/] Don E. Ethridge,[1/]
Billy G. Freeman[2/] and W. C. McArthur[1/]

These geographic areas reflect wide differences in resources and production potential for cotton and competing crops. While production has declined sharply over the last several years, cotton still remains a major crop in many counties within these areas. This report includes information on production, the resource base, and current production practices and problems relating to the Texas Blackland, Coastal Bend, and Lower Rio Grande areas (figure 1).

TEXAS BLACKLAND

Resources and Land Use

The Blackland area consists of 26 counties in central Texas. While the area has about 9.5 million acres in farms, only 2.7 million acres are in cropland (table 1). Cotton was the major crop in the area through the 1940's but acreage has declined steadily since that time, and the downward trend appears to be continuing. However, cotton is still a major crop in the Texas Blackland, particularly in key producing counties (appendix table 1). Major enterprises include grain sorghum, cotton, wheat, oats, hay, and beef cattle. The area also produces some peanuts. While there

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SELECTED COTTON PRODUCTION AREAS IN TEXAS

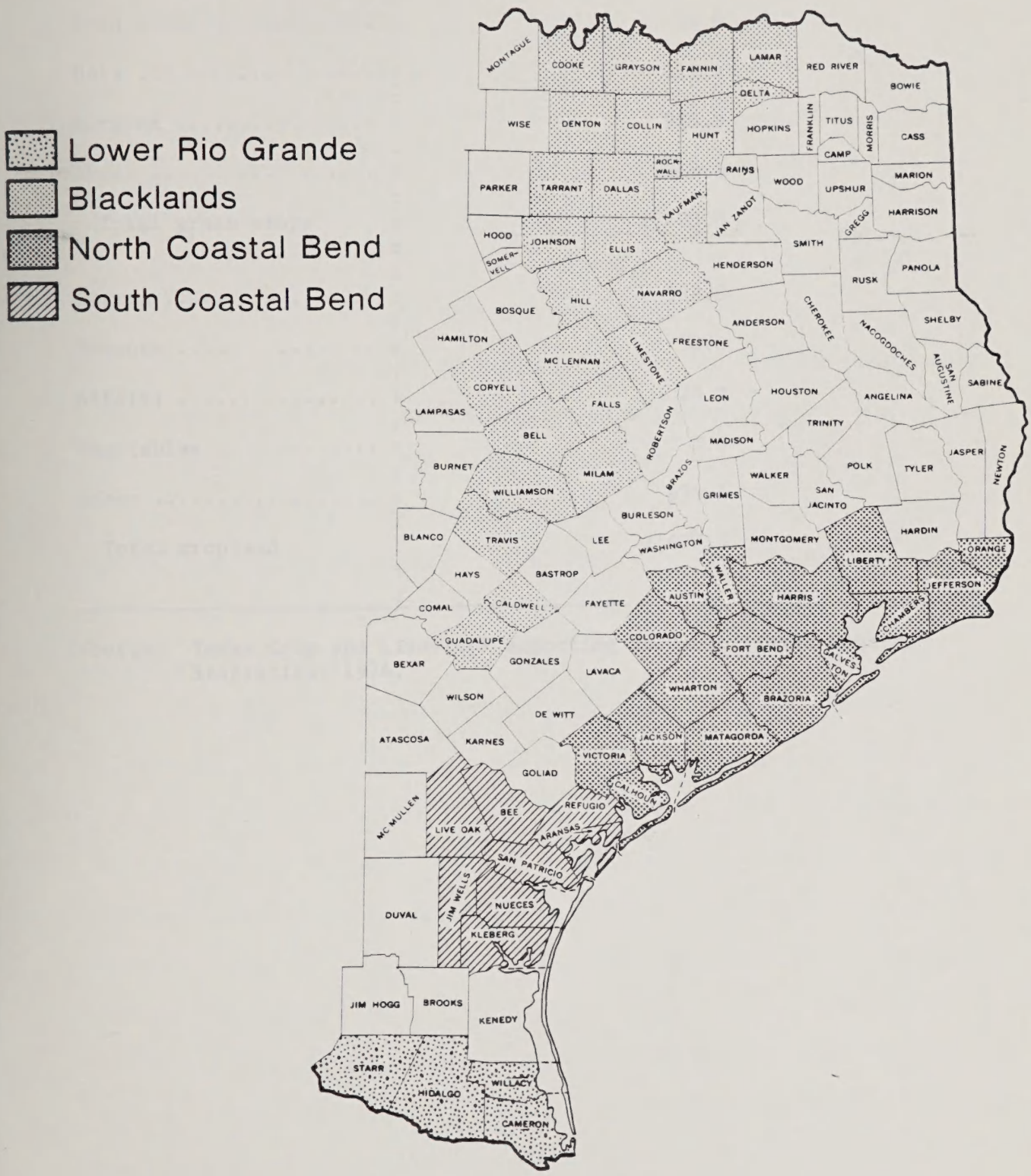

Figure 1

SELECTED COTTON PRODUCTION AREAS
IN TEXAS
Lower Rio Grande
Blackland
North Coastal Area
South Coastal Band

Table 1. Cropland utilization in the Texas Blackland area, 1974

Crop	Cropland harvested (1,000 acres)
Corn	34.0
Oats	119.4
Sorghum	926.9
Wheat	318.0
Total grain crops	1,403.0
Cotton	538.8
Peanuts	30.0
Alfalfa	29.2
Vegetables	2.9
Other	674.4
Total cropland	2,678.3

Source: Texas Crop and Livestock Reporting Service. Texas County Statistics, 1974.

is a limited amount of irrigation, this practice is insignificant in the Blackland area.

Soils, Topography, Climate

The topography of the area is gently rolling with some rather large flat areas interspersed among the rolling portions of the area. The rolling areas generally require contour terracing to control erosion from the heavy rains which frequently occur in the region.

Blackland soils are dark, limey, and high in montmorillonite clay which causes the soil to swell and shrink during wetting and drying cycles. The wide, deep cracks which form during dry periods tend to break plant roots and increase evaporation loss of soil moisture. When the soil is dry, water intake rate is high. However, as the soil becomes wet, it swells, the cracks close, and runoff increases. The dark, heavy clay soils are generally more productive than the "grayland" or mixed soils of the area. Key factors affecting production in the area include the soil, soil moisture and the root rot problem.

The growing (frost-free) season varies from about 230 days in the northern part of the region to about 260 days in the southern part. The climate is considered mild with hot, humid summers. Temperature in relation to growing season is not a deterrent to cotton production. Annual rainfall averages from 35 to 40 inches in the area, decreasing from northeast to southwest. However, distribution of rainfall within the year is often a problem. The winters and springs are often extremely wet, creating problems with land preparation, incorporation of herbicides, and early planting (April). Abnormally wet or dry summers, a seemingly recurring pattern from year to year, adversely affect production of cotton and other crops.

Irrigation is not a common practice in the Blackland area. The entire region uses only about 25,000 acre feet of irrigation water per year. Two-thirds of the water comes from surface sources. In the isolated cases when irrigation occurs, sprinkler irrigation is the common practice.

Production Practices and Problems

Blackland farmers tend to be full owners or part owners (appendix tables 2-3). The part owner operations are generally larger in acreage than either full-owner or tenant operations. Typical farm size is 400-450 acres with approximately one-half of the acreage in cropland. Thus, farm size tends to be smaller than operations further west in the High and Rolling Plains. Pasture land exists on most farms which maintain an average of about 30 cattle per farm. Rents are typically on a share basis. A fourth of the cotton and a third of the grain are common share rental arrangements. The land owner generally pays a proportionate share of fertilizer, harvesting, and ginning costs.

Off-farm employment is an important factor in the Blackland area. About a third of the farm operators work off the farm in full-time jobs. About one-third of the state's population resides in the area, which encompasses centers of industry and commerce such as Dallas, Fort Worth, Austin, and Waco. The area has a long tradition of being a cotton and cash grain producing area. However, major adjustments have occurred in farming patterns during the past 20 years. A rapid growth in business activity and population has placed considerable upward pressure on land values and made farm enlargement financially difficult. However, these developments have also provided off farm employment opportunities within commuting distance of many farms. Many farmers have become part-time farmers rather than adjusting to larger sizes necessary for maintaining

economically viable full-time units. Much of the area has shifted resources to the production of beef cattle, an enterprise consistent with part-time farming and a logical use for cropland that was in the soil bank in the 1960's. The soil-root rot complex has been a key variable in the shift of land out of cotton production in the Blackland area. Other factors contributing to the decline in cotton acreage have been the location of the area to metropolitan centers, part-time employment opportunities, and growth in livestock farming.

Insect and Disease Control

The major cotton production problems, other than those related to rainfall distribution during the year, are root-rot disease and insects. Chemical insect control is generally required. Early season insects such as thrips and fleahoppers frequently delay early plant growth and destroy early cotton squares. These insects present a consistent annual problem. Bollworms and boll weevils are a problem in many years. Thus, constant field checks are necessary to determine application of chemical controls.

Cotton root-rot damage usually occurs in July, and it is worse when rainfall is high in June and July. Insects also tend to be a more critical problem during wet summers. Planting dates for cotton range from about March 20 in the southern part of the region to April 20 in the north; seeding rates range from 40,000 to 50,000 plants per acre. Early planting (April) promotes early crop maturity and thus aids in reducing both insect and disease damage; it also helps avoid harvesting difficulties from fall rains.

Early stalk destruction and crop rotations are also used to combat insect and disease problems. Stalks and other residues are destroyed immediately after harvest by shredding, disking, and chiseling. A common

rotation practice is a three year rotation with two years of high residue crops--grain sorghum and small grains--between cotton crops. The land is gone over with a moldboard plow following harvest of grain crops to aid in control of root-rot disease.

Weed Control and Fertilizer Use

Preemergence herbicides and fertilizer are typically applied in the winter months. Postemergence weed control is accomplished through cultivation of the crop; both rolling and sweep type cultivators are used. On farms where applied, fertilizer application rates are typically 40 to 80 pounds of nitrogen (N) and 10 to 30 pounds of phosphate (P_2O_5) per acre. The fertilizer is applied mostly in dry form. About two-thirds of the commercial farms in the Blackland area received fertilizer in 1974 (appendix table 2).

The incorporation of herbicides into the soil poses a problem when the soil is wet because of the heavy fine texture of the soil. This situation has been the greatest deterrent to narrow row planting and low-tillage practices.

Machinery Use

Most commercial farm enterprises utilize six and eight-row equipment while smaller and part-time farmers use four and six row equipment. There is little equipment leasing in the Blackland; however, custom harvest--combining and cotton stripping--is a common practice. Most cotton in the Blackland area is machine stripped with brush roll strippers. Custom application of herbicides, insecticides, fertilizer, and defoliants is not a predominant practice, although a few producers utilize this service.

Chemical defoliation or dessication is common in the area. The chemicals normally are applied when about 80 percent of the cotton bolls are open.

Competing Enterprises

Cotton competes with sorghum, wheat, oats, hay crops, and cow-calf operations for land resources. However, the competition is limited because of the rotation patterns used and because the competing enterprises facilitate part-time farming. The acreage planted to cotton reached a peak in the early 1950's and has declined rather steadily since then (appendix table 4). Since the pressures underlying the decline appear to be continuing, there is no reason to expect a change in the downward decline in cotton acreage. Some tree crops, vegetables, and peanuts are grown in the area, but acreages are relatively small and these crops do not compete with cotton.

Typical cotton yields in the Blackland area are about 230 pounds of lint per acre. There has been a slight increase in median yields over time, but the yield increases have not been comparable to those in the West and Mid-South. Early maturing varieties are being adopted; these may increase yields by decreasing root-rot damage.

COASTAL BEND AREAS

Resources and Land Use

The Coastal Bend area includes 24 counties lying along the Texas Gulf Coast (figure 1). The entire area has about 2.5 million acres of cropland with about 1.4 million in the northern part and 1.1 million in the southern (table 2). Irrigation is not a common practice in the area except in the production of rice, a major crop in the Northern Coastal Bend. The mix of

Table 2. Cropland utilization in the Coastal Bend, 1974

Crop	Northern	Southern	Total
	Cropland harvested (1,000 acres)		
Cotton	110.5	113.5	224.0
Grains	1,012.4	876.4	1,888.8
Corn	49.4	17.5	66.9
Rice	551.8	0.0	551.8
Sorghum	409.0	823.0	1,232.0
Soybeans	115.1	0.8	115.9
Peanuts	7.8	0.0	7.8
Vegetables	3.0	4.9	7.9
Other	155.9	36.8	192.7
Total	1,404.7	1,032.4	2,437.1

Source: Texas Crop and Livestock Reporting Service, Texas County Statistics, 1974

crops grown differs between the northern and southern parts of the region. Cotton and grain crops both occupy a larger portion of the cropland acreage in the south. Sorghum dominates grain crops in the south, but rice tends to overshadow sorghum in the north. Tree crops are insignificant in both areas; vegetables and peanuts occupy only a minor portion of the acreage. Soybean producion is important in the Northern Coastal Bend, but it is insignificant in the Southern Coastal Bend on acccount of the amount and distribution of rainfall. The acreage planted to cotton has dropped sharply the last several years (appendix tables 5-6).

Soils, Topography, Climate

The topography of the area is flat to very gently rolling on the east, becoming increasingly rolling and hilly toward the west. The flat areas traditionally have been in cropland while the western portion of the area has been mostly pasture and range land.

Soils in the cropped areas are predominantly Coast Prairie soils, including both fine textured soils near the coast and coarse textured soil in the northern area. The Northern Coastal Bend is divided by flood plains of the Brazos and Colorado rivers. Soil differences do not play a major role in crop selection, although there may be some tendency to locate cotton on the clay soils which are subject to cracking. Most of the cotton production is concentrated in four counties--two in the north and two in the south (appendix tables 7 and 8).

The number of days between killing frosts provides a very long growing season, extending from early March to late November. Temperatures are hot and humidity is high during the summer growing season. The length of growing season does not pose a problem for production of cotton or other crop alternatives.

Rainfall is a key variable affecting crop production in the South Coastal Bend but not in the North Coastal Bend. The amount and distribution of rainfall varies considerably between the North and South areas and often from year to year. For example, average annual rainfall varies from about 20 inches in the South Coastal area to over 40 inches in the far northern portion of the Coastal Bend--a 20-inch difference in average annual rainfall. Rainfall also tends to be greater along the coast than further west. While average rainfall is adequate for cotton production, the high variability leads to excess rainfall in some years, even in the south, and

shortages in some years or seasons, even in the highest rainfall areas. These rainfall patterns underlie both the year-to-year yield variations and the relatively low yield expectations.

The months of highest rainfall are August and September followed by June and July. Rainfall is usually lower in October and November. There is great emphasis on early cotton maturity and completing harvest by late August if possible, and in any event no later than mid-September. From the standpoint of rainfall alone, later cotton maturity with harvest in October or November would be desirable, but the risk of crop loss from winds and hurricanes in August and September provide an inducement to harvest early.

There is very little water available for irrigation in the Southern Coastal Bend where only about 3 percent of the cropland is being irrigated.[3/] About 40 percent of the cropland is irrigated in the Northern Coastal Bend, but most of the irrigated land (about 96 percent) is in rice production (appendix table 9).[4/] Very little cotton is irrigated in this area (less than 7,000 acres), and only a small proportion of the sorghum is irrigated. Thus, irrigation is an insignificant practice except in the production of rice.

Production Practices and Problems

In 1974, the average farm size was over 900 acres with farms in the southern area being about 70 percent larger than those in the northern area (appendix tables 10-13). However, only about 37 percent of the acreage was in cropland. The average cotton acreage on farms producing cotton

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3/ Derived from 1974 Texas County Statistics and Inventories of Irrigation in Texas.

4/ Ibid.

(22 percent) was about 100 acres with larger acreages in the south than in the north. Crop farms in the Northern Coastal Bend tend to be rice farms or non-rice farms. The rice farms include soybeans and in a few cases grain sorghum in the rotation. The non-rice farms are primarily cotton and grain sorghum operations.

The most predominant tenure pattern is part owner. In 1974, part owners accounted for 40 percent of commercial farm operators and about 41 percent of the acreage. A part owner typically rents from several landlords with tracts under an operator's management scattered. Individual fields tend to be large in the south and more variable in the north. Share renting is the predominant leasing arrangement. Rents are typically a third of the grain and a fourth of the cotton crop, but the crop share and share of expenses are frequently subject to negotiation. On occasion, landlords play a major role in enterprise choices. An individual operator may have as many different rental arrangements as he has landlords.

There is a substantial amount of non-farm employment. In the northern area, the growth of Houston and industrialization along the coast have encouraged part-time farming and the conversion of small farms to residential use. In the southern area, Corpus Christi, a Gulf port city and the site of a large military installation, provides non-farm employment. Urbanization and industrialization have driven prices for farm land to $1,000 or more per acre and annual taxes to $30 or more per acre in some locations. Income from crop production cannot retain land at those cost levels; the possible exception being rice production. These factors alone are likely to decrease cotton production in these areas in the future.

Insect Control

Insect problems relate largely to the pink bollworm and boll weevil. Early planting of cotton (in March) and early harvest (by mid-September) are strongly emphasized to control insect populations and control costs. In addition, insecticides are commonly used with 7-8 applications being average and increasing rapidly with later planting and maturity. Rotation of cotton and sorghum is also a common control practice.

A program to use earlier maturing (semi-determinant) varieties in order to get earlier harvest and avoid the losses to insects, diseases, weed control, and September wind and rain is being adopted in the Southern Coastal Bend. In the north, however, the shorter season varieties are not being accepted; input reductions are not commensurate with yield reductions because the higher rainfall increases insect problems regardless of variety.

Weed Problems

Weed problems and control practices are similar to those found in the Lower Rio Grande. Herbicide regimes are based largely on preemergence herbicides, commonly Treflan applied in the fall (November) for cotton. Because of higher rainfall, weed (and insect) problems are more intense in the north than in the south.

Fertilizer Use

Fertilizers consist mostly of nitrogen and phosphorus. Because of higher rainfall, fertilizer is used more often with heavier applications being applied in the northern area. In the northern area, 50 to 60 pounds of nitrogen (N) and 40 to 60 pounds of phosphate (P_2O_5) per acre are used on cotton. Rates for sorghum consist of 60 to 80 pounds of nitrogen and

30 to 40 pounds of phosphate per acre. Rates are slightly lower in the southern area and also less acreage is fertilized. In general, the northern area has higher input requirements than the southern area.

Machinery Use

Six-row equipment is typical throughout the region and there is some movement to eight-row equipment, especially on the large farms. Tillage operations are much the same for cotton and sorghum; both crops require practically the same equipment complement except for harvesting. Equipment leasing is uncommon, but custom harvesting for cotton and sorghum is common. The availability of custom harvest service reduces inflexibility associated with harvesting capacities. Custom application of fertilizer and insecticides is also a common practice.

The emphasis on early, rapid cotton harvest can be expected to increase the use of modules in the harvesting operation. Also, the adoption of the new short season varieties is likely to cause a shift from machine picking to machine stripping since the semi-deterministic cottons are better suited for stripping.

Competing Enterprises

In the Southern Coastal Bend, cotton competes with grain sorghum for land resources. While the price relationship between the two crops can induce rapid shifts in acreage, there is a strong tendency for most farmers to produce both crops in a rotation pattern in order to reduce insect, disease, and weed problems and the risk of complete crop failure. Most of the remaining cropland is planted to flax and hay. There is little direct competition between crops and livestock enterprises for land resources; cattle ranches tend to have little cropland and crop farms have little pasture.

Cotton's primary competition in the Northern Coastal Bend also comes from grain sorghum. The competition pattern is essentially the same as in the Southern Coastal Bend. On account of the availability of irrigation water, however, rice production is a major crop. Neither cotton nor grain sorghum can compete with rice under recent price conditions. The rice acreage in the past has been limited by government programs, leaving cotton, sorghum, and some soybeans and peanuts to compete for the remaining land. Most irrigation water not used in rice production has been allocated to soybeans. The limiting factor to expansion of rice acreage at present is irrigation water.

LOWER RIO GRANDE VALLEY

Resources and Land Use

The Lower Rio Grande cotton producing area consists of four counties in the southern tip of Texas. The area contains about 1.3 million acres of cropland. Citrus and vegetable crops are important in the area. Citrus production tends to be concentrated in Cameron and Hidalgo counties. The major field crops are cotton and grain sorghum (table 3). Small acreages of corn and wheat are grown, but these crops are not generally considered to be competitive with cotton for land and water. Sugarcane is increasing in importance in the area.

Irrigation plays a major role in the area's agriculture. Virtually all tree crops and vegetables are irrigated; and 60 to 75 percent of the cotton and 35 to 40 percent of the land in grains is irrigated. The acreage planted to cotton declined substantially the last several years from the larger acreages during the early to mid 1950's (appendix table 14).

Table 3. Cropland utilization in the Lower Rio Grande, 1974

Crop	Cropland harvested (1,000 acres)				Total
	Cameron county	Hidalgo county	Starr county	Willacy county	
Cotton	115.5	125.1	3.7	71.7	316.0
Trees and vines	22.0	72.0	0.1	3.0	97.1
Grains	144.0	322.1	37.1	134.2	637.4
(Corn)	(1.3)	(4.1)	(0.6)	(0.3)	(6.3)
(Sorghum)	(142.0)	(318.0)	(36.5)	(133.5)	(630.0)
(Wheat)	(0.7)	(0.0)	(0.0)	(0.4)	(1.1)
Vegetables	7.2	53.9	8.7	3.8	73.6
Other	6.8	29.8	1.6	6.0	44.2
Total	295.5	602.9	51.2	218.7	1,168.3

Source: Texas Crop and Livestock Reporting Service, Texas County Statistics, 1974

Soils, Topography, Climate

Soils in the Rio Grande are quite variable, ranging from very fine-textured clays to coarse-textured soils. The soils are moderately fertile. Citrus trees produce best on the coarse-textured soils, and production tends to be concentrated in areas where this is the predominant soil. The same is true for vegetable crops, but to a lesser degree. Soil type has little impact on the allocation of land between cotton and grain sorghum. Soil salinity is a problem where the water table lies close to the surface.

Practically all of the row cropping is located in the flood plain of the Rio Grande river, and thus is relatively flat. Topography becomes successively more rolling with movement away from the river.

The growing season does not limit cotton production. The frost-free season lasts about 10 months, the mean date for the last spring freeze being early February and the first fall freeze being early December. Summer temperatures are typically hot and the humidity is high. Cotton in the Lower Rio Grande Valley is normally the first harvested in the United States.

Distribution of rainfall is uneven across the area. Average annual rainfall varies from about 26 inches in the eastern part of the area to about 17 inches in the western part. Non-irrigated cotton and sorghum production is not as common in the western part of the area where rainfall is lower. Distribution of rainfall within the year has at least as much impact on cotton production as the amount of rainfall. September is typically the month with highest rainfall; these rains tend to be associated with winds and/or hurricanes in the Gulf of Mexico. Excessive moisture at that time can destroy crops or it can cause additional plant growth, insect damage and additional control costs, and/or harvest difficulties. Consequently, farmers plant cotton and other crops as early as possible in order to harvest before the September rains.

Water

Irrigation water is primarily from surface sources (table 4). Surface water is allocated on an allotment per acre basis. Typical allotments are about 32-acre inches per year, normally consisting of four irrigations of about 8-acre inches per application. Approximately 75 percent of the metered water allotment reaches the field. Allotees pay for water through (1) a flat rate tax that averages about $6.00 per acre and (2) a delivery charge that averages about $4.00 per acre per irrigation. There may also

Table 4. Annual supply of irrigation water available in a typical year; Lower Rio Grande

County	Surface water	Groundwater	Total
	1,000 acre feet		
Cameron	392.2	0	392.2
Hidalgo	583.9	18.8	602.7
Starr	26.2	0	26.2
Willacy	53.9	0	53.9
Total	1,056.2	18.8	1,075.0

Source: Texas Water Development Board. Inventories of Irrigation Water in Texas; 1958, 1964, 1969, 1974. Report 196, October, 1975.

be extra unallotted water available for the delivery charge. Most allottees receive all the the water they need. A two-year reserve of water in the reservoir is not uncommon.

Additional water is available from wells on farms located near the river. However, pumping costs make groundwater relatively more expensive, especially with rising energy costs. In addition, the groundwater is saline water which leads to salt buildup in the soil. Water from wells is metered and controlled by the Rio Grande Valley Watermaster. There are only about 365 wells in the area.[5/]

Production Practices and Problems

The predominant tenure pattern in the Lower Rio Grande is part owner (appendix tables 16-17). Typical farm size is about 700 acres. There are

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5/ Texas Water Development Board. Inventories of Irrigation in Texas; 1958, 1964, 1969 and 1974. Report 196, October 1975.

some very large owner operations, especially along the river. There are also a large number of small operations. Fields tend to be relatively small especially for irrigated units, reflecting scattered consolidation of small tracts to make a farm unit. Leasing arrangements are typically share-rent, usually a fourth of the cotton and a third of the grain crop. There is considerable negotiation on the share of production costs paid by the owner, but the owner typically pays a proportionate share of ginning and insecticide costs.

There is a considerable amount of nonfarm employment associated with the relatively high proportion of small farms, but a declining trend is probably occurring in nonfarm employment because of the increasing average size of farms. An influx of people into the area for retirement purposes and the existence of citrus farming seem to be factors driving land values up beyond rates associated with inflation. Land prices of $1,500 per acre are not uncommon.

Insect Control

Insects do not constitute a major problem if crops are planted and harvested early. If planting occurs early (late February), four to six applications of the standard insecticides on cotton usually provide adequate control. For later season cotton, 15 to 20 applications may be required and even then control may not be satisfactory. Thus, timing of operations appears to be a key requirement in controlling insecticide and other input costs; its achievement requires considerable management skill.

Rotation of cotton and sorghum is a common practice. Control of insect problems is one reason for rotations, but others include control of soil diseases and as a hedge against crop failure. Most good cotton production

years are poor years for sorghum, and vice versa. Because of pest management and other considerations, there is a strong Extension emphasis on an integrated program which centers around early maturity for cotton and grain sorghum.

The principal insect pests are pink bollworm, tobacco budworm, and boll weevil. A primary means of control for these problems is a stalk destruction deadline of August 31. The destruction deadline is enforced by the Texas Department of Agriculture.

Weed Problems

The primary weed problems are Johnsongrass and pigweed. Common herbicide regimes are based largely on preemergence herbicides. For cotton, the application of Treflan in the fall (November) is a common practice, but it may be applied in the spring prior to planting if weather permits. This regime also controls seedling Johnsongrass. Treflan applied at a double rate or application of Roundup with recirculating sprayers are used to control rhizome Johnsongrass on heavily infested land. Farmers who double crop cotton with vegetables or desire to keep their crop alternatives flexible may use short-lived preemergence herbicides such as Caparol applied at planting time. Some postemergence herbicides are also used, but most postemergence weed control is accomplished with two or three cultivations.

Fertilizer Use

Fertilizer use consists mostly of nitrogen and phosphorus. Typical applications are 40 to 60 pounds of nitrogen (N) and 40 to 50 pounds of phosphate (P_2O_5) per acre for cotton. Slightly higher nitrogen rates and lower phosphate rates are used for grain sorghum. Fertilizer is mostly preplant applied in bulk or liquid form, but there is some sidedressing

with nitrogen later in the growing season. Application is primarily with ground rigs used either by the farmer or by custom operators.

Irrigation Practices

Irrigation water is distributed primarily by row irrigation. Distribution systems are either unlined ditches or underground concrete pipe and gated aluminum pipe. There are some sprinkler systems, but they are used primarily for citrus and vegetables.

There appears to be no serious allocation problems where irrigation water is available, but the high value crops--vegetables and citrus--tend to have priority on water use.

Machinery Use

Six-row equipment is typical on commercial farms although there is still a considerable amount of four-row equipment associated with the smaller operations. Six-row equipment can be expected to become predominant. Equipment leasing is not common except for the leasing of module builders for harvesting cotton. The leasing of module builders, primarily from the High and Rolling Plains, has been evident in recent years. The adoption of modules has been rapid in the Rio Grande Valley on account of both the pressure to complete cotton harvest early and the decline in numbers of gins. Custom harvesting is common for both cotton and grain crops. Custom application of insecticides, herbicides, and defoliants is also common. Insecticides and defoliants are typically applied by air. Typical length of haul from farm to gin is seven to ten miles, but is expected to increase as the number of gins decreases.

Competing Enterprises

Cotton competes primarily with grain sorghum for land. On non-irrigated land, the competition for land is almost entirely between cotton and sorghum. Farmers appear to be highly conscious of price differences and quite flexible in shifting between the two commodities. However, the desire to produce both crops is very strong. By following selected herbicide practices, farmers can shift between cotton and sorghum until planting time. Land preparation for the two crops is essentially the same and machinery requirements, except for harvest equipment, are quite similar.

On irrigated land, cotton is grown in combination with a wide variety of enterprises, including citrus, seed corn, vegetables (lettuce, cabbage, onions, carrots, and so forth), sorghum, some alfalfa and oats, and cattle (mostly purebred on larger farms).

About 35,000 acres of sugarcane have been introduced into the area within the last three years. A mill was constructed to handle this amount of production. This sugarcane acreage is spread over all the valley generally replacing cotton. Farmers obtained favorable results from sugarcane through the 1975-76 season. Given recent production-price relationships, a much larger acreage of sugarcane would be planted if processing capacity were available. On many irrigated farms, especially those that were recently purchased at inflated prices, there appears to be a strongly felt pressure to keep a crop on the ground during all of the year. Consequently, cotton or sorghum is sometimes double or triple cropped with vegetables. Since cotton and grain sorghum compete for land use, the relative prices of these commodities strongly influence year to year shifts in acreages. Except for the fact that both crops are produced at a

higher level of output with higher inputs, their relationship is about the same as that indicated above for non-irrigated land.

Early planting (February, if possible) is stressed as a major part of an Extension program emphasis. As a part of this program, semi-determinant cotton varieties are being pushed. As use of these varieties increases, stripping is expected to expand as the harvest method. The goal is to mature cotton in late July and early August. There would be reduction in the rates of fertilizer and other inputs with concurrent acceptance of reduced yield and expectations. The implicit argument is that realized output would be reduced only slightly, if at all, with drastically reduced inputs that aimed for a realistic attainable output that matured before the September problem period.

SUMMARY

Texas Blackland

While cotton is a major crop in several counties in the Texas Blackland, the overall importance of cotton in the area continues to decline. A major factor in the declining cotton acreage has been the soil root-rot complex. The relatively low yields caused by the soil root-rot complex does not provide the potential for a higher level of inputs to enhance production. Other factors contributing to the declining importance of cotton in the area's agriculture include location with respect to metropolitan centers, increases in part-time farming opportunities, and the growth of livestock.

The rapid growth in business activity and population has placed considerable upward pressure on land values, a situation making farm enlargement financially difficult. Consequently, many farmers have changed to part-time farming rather than adjust to larger sizes necessary for maintaining

economically viable full-time units. Since the pressures underlying the decline appear to be continuing, there is no reason to expect a change in the downward trend in cotton acreage.

Coastal Bend Areas

The decline in cotton acreage has been sharply downward in both Coastal areas since the early 1950's. Cotton occupied less than eight percent of the cropland in the Northern Coastal Bend in 1974, and only eleven percent in the Southern Coastal area. Rice is the major crop in the Northern Coastal area. Neither cotton nor sorghum can compete with rice under current price relationships. Sorghum offers the main competition to cotton in both areas.

The risk factors and potential for production response to inputs are considerably different between these areas. While the amount and distribution of rainfall dominate agriculture in the Southern Coastal area, the urban-industrial complex is a key factor affecting agriculture in the Northern area. The growth of Houston and industrialization along the coast have encouraged part-time farming and the conversion of small farms to residential uses. There is also a substantial amount of nonfarm employment in this area. The spread of urbanization and increasing industrialization have exerted upward pressures on land prices and property taxes to the extent that income from crop production cannot retain land in production under these conditions with the possible exception of rice production. These factors alone are likely to decrease cotton production in the North Coastal Bend in the years ahead.

Rio Grande Valley

A variety of crops characterize agricultural production in the Rio Grande Valley. Cotton and grain sorghum are the major field crops. Although

the acreage planted to cotton has declined substantially since the early 1950's, cotton remains a major crop in the area. Farmers irrigate 60 to 75 percent of the cotton acreage, and 35 to 40 percent of the land in grain. Cotton competes primarily with grain sorghum for land use. Growers appear to be quite flexible in shifting between the two crops with relative prices being the main factor affecting year to year shifts in acreages.

Improvements in production technology being stressed in an Extension program offer possibilities for increasing the competitive strength of cotton in the valley. The program emphasis centers around the adoption of earlier maturing varieties of cotton to be used in combination with lower levels of fertilizer and other inputs. The new production practices are expected to reduce yield variability, production costs, and to result in a shift from machine picking to stripping of cotton.

Appendix Table 1. Cropland utilization in the Texas Blackland area, 1974

County	Grain crops					Other crops					Total all crops
	Corn	Oats	Sorghum	Wheat	Total	Cotton	Peanuts	Alfalfa	Vegetables	Other	
	Cropland harvested (1,000 acres)										
Bell	2.9	6.9	67.0	7.7	84.5	26.9	0.0	0.1	0.0	14.6	126.1
Caldwell	2.9	0.4	29.1	7.2	39.6	4.5	0.0	0.0	0.0	12.5	56.6
Collin	0.6	11.7	64.1	45.0	121.4	36.5	0.0	3.6	0.5	32.2	194.2
Cooke	0.0	7.3	7.2	30.4	46.4	2.6	0.9	5.2	0.0	30.1	85.2
Coryell	0.9	7.9	16.8	10.3	35.9	4.0	0.1	0.6	0.0	27.3	67.9
Dallas	0.0	3.8	17.6	10.5	31.9	6.2	0.0	1.0	0.2	21.0	60.3
Delta	0.0	0.6	6.2	0.5	7.3	10.2	0.0	0.8	0.0	15.2	33.5
Denton	0.5	14.9	21.0	38.0	74.7	11.6	4.2	1.9	0.0	0.0	92.4
Ellis	0.9	3.1	66.3	14.8	85.1	72.5	0.0	0.7	0.0	32.7	191.0
Falls	2.4	3.7	48.2	7.5	61.8	28.7	0.0	0.7	0.0	15.9	107.1
Fannin	0.9	5.5	43.0	22.8	72.5	15.2	7.2	3.7	0.0	39.5	138.1
Grayson	0.3	7.1	17.8	33.3	58.5	7.7	6.0	0.0	0.0	70.2	142.4
Guadalupe	3.7	0.6	56.1	12.0	72.4	1.0	0.9	0.0	0.7	12.5	87.5
Hill	3.2	2.5	99.4	7.1	112.6	73.3	4.7	0.0	0.0	41.2	231.8
Hunt	0.7	2.5	9.3	2.5	15.0	29.7	0.0	0.0	0.0	35.5	80.2
Johnson	0.9	3.6	15.9	3.1	23.5	16.5	2.0	0.0	0.0	27.0	69.0
Kaufman	0.0	5.0	10.1	7.3	23.6	10.2	0.0	2.5	0.0	37.7	74.0
Lamar	0.4	2.8	18.5	4.3	26.0	8.1	1.6	6.5	0.0	51.8	94.0
Limestone	1.8	2.4	18.0	2.8	25.0	4.0	0.0	0.0	0.6	0.0	29.6
McLennan	3.4	15.4	52.2	15.8	87.8	25.6	1.1	1.2	0.1	40.6	156.4
Milam	1.7	0.8	49.6	2.8	54.9	29.6	1.3	0.0	0.0	14.3	100.1
Navarro	0.0	3.0	26.3	10.0	39.3	38.1	0.0	0.7	0.0	24.1	102.2
Rockwell	0.0	2.7	1.2	1.1	5.0	0.6	0.0	0.0	0.0	6.5	12.1
Tarrant	0.0	2.8	5.6	18.8	27.2	2.7	0.0	0.0	0.8	32.8	63.5
Travis	0.8	0.2	55.0	0.3	56.3	11.6	0.0	0.0	0.0	15.4	83.3
Williamson	5.1	2.2	105.4	2.1	114.8	61.2	0.0	0.0	0.0	23.8	199.8
Total	34.0	119.4	926.9	318.0	1,403.0	538.8	30.0	29.2	2.9	674.4	2,678.3

Source: Texas Crop and Livestock Reporting Service, Texas County Statistics, 1974

Appendix Table 2. Selected Characteristics of farms with sales of at least $2,500, 1974, Blackland area

Item	Farms reporting	Average per farm	Average per farm reporting	Acreage irrigated	Acreage fertilized	Yield per acre
	Percent	Acre	Acre	Percent	Percent	
Total number farms - 18,960						
Total acres - 8.6 million						
Total land (acres).....	100	454	454	0	26	
Cropland	91	234	257	1		
Cotton	25	30	118	1	77	0.4 bl.
Wheat	18	16	91	0	81	20 bu.
Barley	0	0	29	0	75	26 bu.
Sorghum	42	54	126	1	76	1/46 bu.
Hay	53	27	51	1	36	1.7 ton
Vegetables	1	0	19	9	78	
Orchards	3	1	31	6	20	
Irrigated land	2	2	74	100		
Furrows or ditches	0	1	107			
Sprinkler systems	2	1	60			
Irrigated cropland	2	2	74	100		
Land fertilized	67	116	174		100	
Row crop insecticides	16	32	197			
Crop herbicides	17	33	200			
Defoliants	11	15	134			
Ownership:						
Full owners	49	159	328			
Part owners	35	223	642			
Tenants	16	72	428			
Size:						
100-499	57					
500-1,999 acres	22					
2,000 acres and over ...	3					
Operator age 65 and over	23					
Operators working off-farm 200 days and over	29					
		Number				
Wheel tractors	82	1.8	2.2			
1970 or newer		0.3	0.4			
Crawler tractors	3	0.0	1.2			
Acre ft. irrigation water applied per acre			1.0			

1/ Harvested for grain.

Source: Bureau of the Census, U.S. Dept. of Commerce, 1974 Census of Agriculture.

Appendix Table 3. Selected characteristics of farms with sales of at least $2,500, 1969, Blackland area

Item	Farms reporting	Average per farm	Average per farm reporting	Acreage irrigated	Acreage fertilized	Yield per acre
	Percent	Acre	Acre	Percent	Percent	
Total number farms - 22,220						
Total acres - 9.5 million						
Total land (acres)	100	428	428	0	26	
Cropland	91	231	252	1		
Cotton	42	38	91	1	64	0.4 bl
Wheat	19	10	54	0	73	22 bu.
Barley	1	0	33	0	66	32 bu.
Sorghum	38	39	105	1	83	1/36 bu.
Hay	48	23	49	2	31	1.5 to
Vegetables	1	0	20	20	83	
Orchards	5	1	22	4	28	
Irrigated land	2	2	92	100		
Furrows or ditches						
Sprinkler systems						
Irrigated cropland	2	2	84	100		
Land fertilized	64	112	175		100	
Row crop insecticides	22	28	125			
Crop herbicides	23	30	128			
Defoliants	26	27	105			
Ownership:						
Full owners	45	142	315			
Part owners	35	213	604			
Tenants	20	74	373			
Size:						
100-499	62					
500-1,999 acres	22					
2,000 acres and over	2					
Operator age 65 and over	19					
Operators working off-farm 200 days and over	30					
		Number				
Wheel tractors	86	1.8	2.1			
1965 or newer		0.6	0.6			
Crawler tractors	3	0.0	1.3			
Acre ft. irrigation water applied per acre			NA			

1/ Harvested for grain.

Source: Bureau of the Census, U.S. Dept. of Commerce, 1974 Census of Agriculture.

Appendix Table 4. Cotton acreage, production, and yield per acre in the Texas Blackland area, 1947-74

Year	Acres planted	Acres harvested	Bales produced	Pounds of lint per acre
1947	2,398,100	2,386,000	854,860	171
1948	2,419,800	2,398,700	800,870	160
1949	2,752,300	2,734,800	1,106,550	194
1950	1,858,500	1,774,250	586,690	158
1951	2,740,700	2,691,600	644,290	114
1952	2,386,000	2,358,000	644,670	131
1953	2,250,500	2,223,730	1,132,030	244
1954	1,735,100	1,681,200	471,230	134
1955	1,519,950	1,464,850	666,800	218
1956	1,538,600	1,363,500	363,640	128
1957	1,246,400	1,215,250	440,090	173
1958	946,250	916,230	440,610	230
1959	1,300,420	1,244,250	502,080	193
1960	1,333,550	1,239,520	467,450	181
1961	1,353,700	1,249,830	435,700	167
1962	1,277,300	1,194,800	466,790	187
1963	1,122,350	1,073,200	535,650	239
1964	1,104,700	1,069,000	470,090	211
1965	1,040,640	992,150	487,900	236
1966	811,200	766,950	504,950	316
1967	748,450	682,200	272,840	191
1968	758,600	733,500	425,100	278
1969	868,950	786,500	269,830	164
1970	902,150	869,500	372,210	205
1971	881,500	774,400	317,750	196
1972	868,600	789,200	506,900	308
1973	771,200	721,500	437,925	291
1974	706,350	539,250	219,740	195

Average yield 1947 - 1956 ---- 165.7 pounds
Average yield 1956 - 1965 ---- 194.9 do.
Average yield 1965 - 1974 ---- 238.5 do.

Source: Statistical Reporting Service, USDA.

Appendix Table 5. Cotton acreage, production, and yield per acre in the Northern Coastal Bend area, 1947-74

Year	Acres planted	Acres harvested	Bales produced	Pounds of lint per acre
1947	329,415	236,570	149,130	219
1948	340,615	336,545	191,608	273
1949	374,734	371,338	243,233	314
1950	260,900	256,340	135,008	252
1951	449,320	446,610	284,273	305
1952	446,125	440,425	256,557	279
1953	460,685	451,980	265,155	281
1954	299,685	291,360	212,263	349
1955	274,120	268,120	264,815	474
1956	272,570	265,472	178,674	323
1957	249,250	243,550	174,591	344
1958	221,030	215,400	173,080	385
1959	290,810	284,810	180,430	304
1960	306,000	286,850	120,100	200
1961	303,730	279,300	111,740	192
1962	335,300	320,400	231,843	347
1963	263,450	253,000	246,925	468
1964	273,600	266,340	271,410	489
1965	262,350	253,350	220,940	418
1966	189,320	156,720	93,670	286
1967	175,880	168,630	127,040	361
1968	198,550	177,750	84,835	229
1969	210,110	191,000	99,795	250
1970	199,500	179,900	125,080	333
1971	179,350	152,700	90,225	283
1972	179,200	168,400	127,275	362
1973	133,020	112,000	49,470	212
1974	117,150	110,300	80,895	352

Average yield 1947 - 1956 ---- 307.3 pounds
Average yield 1956 - 1965 ---- 347.3 do.
Average yield 1965 - 1974 ---- 309.1 do.

Source: Statistical Reporting Service, USDA.

Appendix Table 6. Cotton acreage, production, and yield per acre in the Southern Coastal Bend area, 1947-74

Year	Acres planted	Acres harvested	Bales produced	Pounds of lint per acre
1947	261,450	259,490	145,410	268
1948	224,500	221,170	125,460	272
1949	375,770	372,750	274,540	353
1950	234,570	229,400	101,930	213
1951	549,370	460,900	109,890	114
1952	455,030	447,600	254,890	273
1953	389,180	340,150	87,030	122
1954	320,570	314,400	246,850	376
1955	238,350	213,050	73,170	164
1956	254,830	241,790	149,110	296
1957	220,400	215,600	126,350	281
1958	222,860	218,100	189,070	416
1959	269,400	262,550	170,290	311
1960	282,720	268,900	174,470	311
1961	279,200	269,350	180,940	322
1962	314,800	294,700	178,650	290
1963	276,960	259,200	112,840	208
1964	283,500	272,700	183,765	323
1965	264,800	255,900	188,620	353
1966	181,250	169,900	155,100	438
1967	165,400	158,100	106,170	322
1968	197,000	180,850	108,370	287
1969	207,500	194,400	115,275	284
1970	193,900	142,000	57,580	194
1971	145,200	122,550	58,400	228
1972	174,750	158,400	99,350	301
1973	112,250	98,450	55,405	270
1974	116,850	113,450	109,920	465

Average yield 1947 - 1956 ---- 245.6 pounds
Average yield 1956 - 1965 ---- 311.6 do.
Average yield 1965 - 1974 ---- 314.6 do.

Source: Statistical Reporting Service, USDA.

Appendix Table 7. Cropland utilization in the Northern Coastal Bend area, 1974

County	Cotton	Peanuts	Soybeans	Grains				Vegetables	Other	Total
				Corn	Rice	Sorghum	Total			
	Cropland harvested (1,000 acres)									
Austin	4.5	0.8	0.0	6.8	3.6	12.1	22.6	0.1	15.4	43.4
Brazoria	4.7	0.0	7.0	1.6	59.6	8.6	69.8	0.3	9.5	91.3
Calhoun	4.6	0.0	0.0	0.0	11.0	49.4	60.4	0.0	0.0	65.0
Chambers	0.0	0.0	7.0	0.0	49.9	0.5	50.4	0.0	2.2	59.6
Colorado	3.1	0.8	3.1	9.2	42.5	4.0	55.8	0.0	29.5	92.3
Fort Bend	42.5	0.0	2.1	4.1	26.8	55.9	86.8	0.6	17.9	149.9
Galveston	0.0	0.0	1.2	0.0	6.5	0.0	6.5	0.3	0.0	8.0
Harris	0.9	1.3	17.4	2.0	30.9	1.6	35.2	0.5	14.4	69.7
Jackson	5.1	0.0	2.8	0.7	40.8	58.4	100.8	0.0	6.6	115.3
Jefferson	0.0	0.0	3.4	0.0	74.3	0.0	74.3	0.0	3.1	80.8
Liberty	0.0	0.0	33.3	0.0	44.1	4.1	48.2	0.1	7.1	88.7
Matagorda	5.5	0.0	14.0	0.6	53.8	26.4	80.8	0.0	3.6	103.9
Orange	0.0	0.0	3.5	0.0	2.5	0.0	2.5	0.0	0.6	6.6
Victoria	0.5	0.0	0.0	2.8	4.6	63.0	70.8	0.0	7.3	78.6
Waller	0.8	4.9	5.7	13.1	17.7	2.9	33.7	0.7	31.9	77.7
Wharton	38.3	0.0	14.6	8.5	83.2	122.1	213.8	0.4	6.8	273.9
Total	110.5	7.8	115.1	49.4	551.8	409.0	1,012.4	3.0	155.9	1,404.7

Sources: Texas Crop and Livestock Reporting Service, Texas County Statistics, 1974

Appendix Table 8. Cropland utilization in the Northern Coastal Bend area, 1974

County	Cotton	Peanuts	Soybeans	Grains				Vegetables	Other	Total
				Corn	Rice	Sorghum	Total			
	Cropland harvested (1,000 acres)									
Aransas	0.5	0.0	0.0	0.0	0.0	2.3	2.3	0.0	0.6	3.4
Bee	1.5	0.0	0.0	3.0	0.0	70.9	85.3	0.2	7.0	94.0
Jim Wells	3.4	0.0	0.0	2.1	0.0	89.8	98.7	1.3	6.8	110.2
Kleberg	5.9	0.0	0.0	0.0	0.0	26.7	26.7	1.2	1.6	35.4
Live Oak	1.6	0.0	0.0	10.2	0.0	42.3	61.5	0.4	10.8	74.3
Nueces	54.8	0.0	0.8	1.0	0.0	296.7	301.7	0.0	1.9	359.2
Refugio	3.8	0.0	0.0	0.5	0.0	76.0	78.1	0.0	2.6	84.5
San Patricio	42.0	0.0	0.0	0.7	0.0	218.3	221.1	1.8	5.5	271.4
Total	113.5	0.0	0.8	17.5	0.0	823.0	876.4	4.9	36.8	1,032.4

Sources: Texas Crop and Livestock Reporting Service, Texas County Statistics, 1974

Appendix Table 9. Use of irrigation water in the Northern Coastal Bend, 1974[1/]

County	Surface water	Ground water	Total
	1,000 acre feet		
Austin	0.0	10.2	10.2
Brazoria	138.1	20.2	158.3
Calhoun	40.5	2.7	43.2
Chambers	125.3	0.0	125.3
Colorado	118.3	59.8	178.1
Fort Bend	21.9	46.6	68.5
Galveston	17.3	0.2	17.5
Harris	8.4	82.5	90.9
Jackson	2.4	123.1	125.5
Jefferson	173.7	0.0	173.7
Liberty	70.0	33.7	103.7
Matagorda	172.2	36.5	208.7
Orange	9.2	1.1	10.3
Victoria	0.1	16.0	16.1
Waller	0.2	29.8	30.0
Wharton	75.4	179.8	255.2
Total	973.0	642.2	1,615.2

1/ Ninety-six percent of the irrigation in this area relates to rice production.

Source: Texas Water Development Board. Inventories of Irrigation in Texas; 1958, 1964, 1969, and 1974, Report 196, October, 1975.

Appendix Table 10. Selected characteristics of farms with sales of at least $2,500, 1974, Northern Coastal Bend area

Item	Farms reporting	Average per farm	Average per farm reporting	Acreage irrigated	Acreage fertilized	Yield per acre
	Percent	Acre	Acre	Percent	Percent	
Total number farms - 7,224						
Total acres - 5.5 million						
Total land (acres)	100	769	769	11	23	
Cropland	89	304	342	27		
Cotton	19	15	82	3	89	0.8 bl.
Wheat	0	0	51	9	63	17 bu.
Barley	0	0	155	0	19	6 bu.
Sorghum	29	53	179	1	86	1/57 bu.
Hay	38	18	47	3	36	2.1 tons
Vegetables	2	0	15	17	64	
Orchards	2	1	42	1	21	
Irrigated land	21	83	397	100		
Furrows or ditches	3	8	301			
Sprinkler systems	1	1	94			
Irrigated cropland	21	82	393	100		
Land fertilized	73	173	239		100	
Row crop insecticides	22	69	314			
Crop herbicides	25	92	371			
Defoliants	4	5	112			
Ownership:						
Full owners	38	210	550			
Part owners	40	426	1,055			
Tenants	21	133	620			
Size:						
100-499	48					
500-1,999 acres	25					
2,000 acres and over	7					
Operator age 65 and over	21					
Operators working off-farm 200 days and over	24					
		Number				
Wheel tractors	79	2.1	2.5			
1970 or newer		0.6	0.7			
Crawler tractors	4	0.1	1.3			
Acre ft. irrigation water applied per acre			2.3			

1/ Harvested for grain.

Source: Bureau of the Census, U.S. Dept. of Commerce, 1974 Census of Agriculture.

Appendix Table 11. Selected characteristics of farms with sales of at least $2,500, 1974, Southern Coastal Bend area

Item	Farms reporting	Average per farm	Average per farm reporting	Acreage irrigated	Acreage fertilized	Yield per acre
	Percent	Acre	Acre	Percent	Percent	
Total number farms - 2,783						
Total acres - 3.7 million						
Total land (acres)	100	1,323	1,323	1	20	
Cropland	90	426	472	2		
Cotton	30	38	127	1	82	1.0 bl.
Wheat	4	6	137	0	60	13 bu.
Barley	0	0	43	0	0	25 bu.
Sorghum	66	267	403	2	74	1/50 bu.
Hay	25	22	87	4	26	1.7 tons
Vegetables	1	1	47	37	46	
Orchards	0	0	2	0	0	
Irrigated land	4	9	239	100		
Furrows or ditches	1	3	211			
Sprinkler systems	2	3	148			
Irrigated cropland	4	7	202	100		
Land fertilized	64	263	410		100	
Row crop insecticides	26	90	351			
Crop herbicides	24	101	414			
Defoliants	11	18	165			
Ownership:						
Full owners	39	280	720			
Part owners	39	799	2,049			
Tenants	22	244	1,105			
Size:						
100-499	44					
500-1,999 acres	35					
2,000 acres and over	10					
Operator age 65 and over	24					
Operators working off-farm						
200 days and over	23					
		Number				
Wheel tractors	83	2.1	2.5			
1970 or newer		0.6	0.7			
Crawler tractors	3	0.0	1.2			
Acre ft. irrigation water applied per acre			0.9			

1/ Harvested for grain.

Source: Bureau of the Census, U.S. Dept. of Commerce, 1974 Census of Agriculture.

Appendix Table 12. Selected characteristics of farms with sales of at least $2,500, 1969, Northern Coastal Bend area

Item	Farms reporting	Average per farm	Average per farm reporting	Acreage irrigated	Acreage fertilized	Yield per acre
	Percent	Acre	Acre	Percent	Percent	
Total number farms - 8,753						
Total acres - 5.9 million						
Total land (acres)	100	670	670	11	22	
Cropland	87	271	313	26		
Cotton	33	23	71	8	85	0.5 bl.
Wheat	0	0	63	3	79	24 bu.
Barley	0	0	11	0	0	9 bu.
Sorghum	24	29	122	3	91	1/47 bu.
Hay	35	15	43	5	31	
Vegetables	3	0	16	17	80	
Orchards	5	1	27	2	40	
Irrigated land	22	72	333	100		
Furrows or ditches						
Sprinkler systems						
Irrigated cropland	21	70	330	100		
Land fertilized	68	146	213		100	
Row crop insecticides	28	42	152			
Crop herbicides	34	77	225			
Defoliants	7	6	86			
Ownership:						
Full owners	33	155	463			
Part owners	42	395	944			
Tenants	25	119	484			
Size:						
100-499	52					
500-1,999 acres	24					
2,000 acres and over ...	6					
Operator age 65 and over	16					
Operators working off-farm						
200 days and over	26					
		Number				
Wheel tractors		2.1				
1965 or newer		0.9				
Crawler tractors						
Acre ft. irrigation water applied per acre		NA				

1/ Harvested for grain.

Source: Bureau of the Census, U.S. Dept. of Commerce, 1974 Census of Agriculture.

Appendix Table 13. Selected characteristics of farms with sales of at least $2,500, 1969, Southern Coastal Bend area

Item	Farms reporting	Average per farm	Average per farm reporting	Acreage irrigated	Acreage fertilized	Yield per acre
	Percent	Acre	Acre	Percent	Percent	
Total number farms - 3,159						
Total acres - 3.8 million						
Total land (acres)	100	1,213	1,213	1	16	
Cropland	91	409	447	2		
Cotton	57	65	114	3	61	0.6 bl.
Wheat	1	1	56	5	31	16 bu.
Barley	0	0	30	0	100	15 bu.
Sorghum	69	204	295	2	58	1/50 bu.
Hay	17	9	51	7	37	
Vegetables	3	2	67	27	93	
Orchards	0	0	4	35	58	
Irrigated land	4	9	219	100		
Furrows or ditches						
Sprinkler systems						
Irrigated cropland	4	8	206	100		
Land fertilized	55	189	345		100	
Row crop insecticides	39	57	148			
Crop herbicides	24	48	199			
Defoliants	23	30	127			
Ownership:						
Full owners	32	218	684			
Part owners	42	795	1,892			
Tenants	26	201	767			
Size:						
100-499	50					
500-1,999 acres	34					
2,000 acres and over	8					
Operator age 65 and over	18					
Operators working off-farm 200 days and over	25					
		Number				
Wheel tractors		2.2				
1965 or newer		0.9				
Crawler tractors						
Acre ft. irrigation water applied per acre			NA			

1/ Harvested for grain.

Source: Bureau of the Census, U.S. Dept. of Commerce, 1974 Census of Agriculture.

Appendix Table 14. Cotton acreage, production, and yield per acre in the Lower Rio Grande area, 1947-74

Year	Acres planted	Acres harvested	Bales produced	Pounds of lint per acre
1947	409,300	406,500	262,810	310
1948	554,500	545,500	329,100	289
1949	746,500	739,500	543,400	352
1950	403,800	395,000	328,840	399
1951	880,700	868,500	623,900	344
1952	736,000	693,100	316,950	219
1953	777,500	741,500	262,710	170
1954	499,400	480,900	415,250	414
1955	506,600	478,600	390,100	391
1956	468,200	451,500	404,650	430
1957	354,000	350,000	286,850	393
1958	419,650	399,500	406,000	487
1959	474,200	454,500	458,500	484
1960	487,100	461,900	351,400	365
1961	489,900	472,000	338,300	344
1962	489,950	469,600	424,900	434
1963	436,900	412,080	274,100	319
1964	412,900	395,000	337,450	410
1965	383,200	369,250	388,920	505
1966	287,400	265,000	251,400	455
1967	273,000	263,000	316,300	577
1968	320,000	280,000	242,500	415
1969	322,200	293,000	307,100	503
1970	307,400	281,900	188,900	321
1971	257,500	252,300	269,300	512
1972	323,400	318,000	292,400	441
1973	277,500	257,000	190,200	355
1974	323,000	316,000	286,700	435

Average yield 1947 - 1956 ---- 332.3 pounds
Average yield 1956 - 1965 ---- 417.4 do.
Average yield 1965 - 1974 ---- 452.3 do.

Source: Statistical Reporting Service, USDA.

Appendix Table 15. Selected characteristics of farms with sales of at least $2,500, 1974, Lower Rio Grande area

Item	Farms reporting	Average per farm	Average per farm reporting	Acreage irrigated	Acreage fertilized	Yield per acre
	Percent	Acre	Acre	Percent	Percent	
Total number farms - 3,313						
Total acres - 1.9 million						
Total land (acres)	100	572	572	25	30	
Cropland	94	294	314	49		
Cotton	43	77	179	62	64	1.0 bl.
Wheat	0	0	72	18	20	9.8 bu.
Barley	0	0	14	62	62	34.3 bu.
Sorghum	46	123	269	36	54	1/48.5 bu.
Hay	10	4	45	41	28	1.9 tons
Vegetables	11	18	162	95	95	
Orchards	36	23	64	97	83	
Irrigated land	68	144	213	100		
Furrows or ditches	42	108	257			
Sprinkler systems	4	5	107			
Irrigated cropland	67	143	212	100		
Land fertilized	67	170	253		100	
Row crop insecticides	40	137	347			
Crop herbicides	21	87	421			
Defoliants	14	32	231			
Ownership:						
Full owners	56	240	431			
Part owners	35	269	770			
Tenants	9	64	676			
Size:						
100-499	30					
500-1,999 acres	18					
2,000 acres and over	5					
Operator age 65 and over	18					
Operators working off-farm 200 days and over	27					
			Number			
Wheel tractors	80	2.0	2.5			
1970 or newer		0.9	1.1			
Crawler tractors	3	0.0	1.4			
Acre ft. irrigation water applied per acre			1.7			

1/ Harvested for grain.

Source: Bureau of the Census, U.S. Dept. of Commerce, 1974 Census of Agriculture.

Appendix Table 16. Selected characteristics of farms with sales of at least $2,500, 1969, Lower Rio Grande area

Item	Farms reporting	Average per farm	Average per farm reporting	Acreage irrigated	Acreage fertilized	Yield per acre
	Percent	Acre	Acre	Percent	Percent	
Total number farms - 3,734						
Total acres - 2.0 million						
Total land (acres)	100	534	534	26	29	
Cropland	94	276	293	51		
Cotton	56	77	137	65	76	1.1 bl.
Wheat	0	0	170	0	15	26 bu.
Barley	0	0	150	100	0	35 bu.
Sorghum	46	103	225	38	46	1/47 bu.
Hay	8	3	42	51	25	2.2 tons
Vegetables	20	23	119	95	94	
Orchards	35	14	40	95	98	
Irrigated land	71	141	198	100		
Furrows or ditches						
Sprinkler systems						
Irrigated cropland	70	140	199	100		
Land fertilized	76	153	201		100	
Row crop insecticides	51	101	198			
Crop herbicides	23	51	227			
Defoliants	22	39	172			
Ownership:						
Full owners	46	131	284			
Part owners	42	322	777			
Tenants	12	81	653			
Size:						
100-499	34					
500-1,999 acres	17					
2,000 acres and over	4					
Operator age 65 and over	18					
Operators working off-farm 200 days and over	30					
		Number				
Wheel tractors	75	1.9	2.5			
1965 or newer		1.0	1.3			
Crawler tractors	4	0.1	1.3			
Acre ft. irrigation water applied per acre			1.6			

1/ Harvested for grain.

Source: Bureau of the Census, U.S. Dept. of Commerce, 1974 Census of Agriculture.